

CLAIMS

1. An array type choke coil characterized by comprising:
a coil group arranging a plurality of terminal-integrated
type coils formed by bending a metal sheet in a preset development
5 form and having a set positional relationship; and
a magnetic material burying therein the coil group.

2. An array type choke coil according to claim 1, wherein
the coil group structure arranges the axes of coil constituting
10 the coil group in parallel, where the center point of at least
one coil selected from the plurality of coils and the center point
of a coil other than the selected coil are in a staggered arrangement.

3. An array type choke coil according to claim 2, wherein
15 a predetermined inductance value is obtained by changing the
distance between the center point of at least one coil selected
from the coil group and a center point of at least one coil selected
from the plurality of coils other than the selected coil.

20 4. An array type choke coil according to claim 2, wherein
a predetermined inductance value is obtained by changing the height
of a center point of at least one coil selected from the coil group
and a center point of at least one coil selected from the plurality
of coils other than the selected coil.

25

5. An array type choke coil according to claim 2, wherein
at least one coil selected from the coil group and both coils
immediately adjacent to the selected coil are in a V-form or inverted
V-form arrangement, to make a direction of magnetic flux extending
30 through the coil caused upon flow of a current to the selected

coil and a direction of magnetic flux extending through the coil caused upon flow of a current to the two coils arranged immediately adjacent different in direction from each other.

5 6. An array type choke coil according to claim 2, wherein
at least one coil selected from the coil group and both coils
immediately adjacent to the selected coil are in a V-form or inverted
V-form arrangement, to make a direction of a magnetic flux caused
upon flow of a current to the selected coil and a direction of
10 magnetic flux caused upon flow of a current to the two coils arranged
immediately adjacent the same in direction.

 7. An array type choke coil according to claim 2, wherein
the coils constituting the coil group have the number of turns
15 of $(N + 0.5)$ turns (where N is an integer equal to or greater than
1), to provide an arrangement structure stacking an N -turn portion
of the coil selected from the coil group and an $(N + 0.5)$ -turn
portion of the coil immediately adjacent to the selected coil.

20 8. An array type choke coil according to claim 5 or 6, wherein
a predetermined inductance value is obtained by changing respective
distances between a center point of the coil selected and center
points of the both coils arranged immediately adjacent.

25 9. An array type choke coil according to claim 1, wherein
the coil group arranges the coils such that center points of the
plurality of coils constituting the coil group are on a same plane.

 10. An array type choke coil according to claim 9, wherein
30 a predetermined inductance value is obtained by changing the

distance between center points of two coils immediately adjacent among the plurality of coils.

11. An array type choke coil according to claim 9, wherein
5 the coil group is arranged such that magnetic fluxes in the coils caused upon flow of currents to the plurality of coils alternate in direction.

12. An array type choke coil according to claim 9, wherein
10 the coil group is arranged such that magnetic fluxes in the coils caused upon flow of currents to the plurality of coils are same in direction.

13. An array type choke coil according to claim 1, wherein
15 the coil group structure arranges the axes of coils constituting the coil group in parallel, having a distance between the center point of at least one coil selected from the plurality of coils and the center point of a coil immediately adjacent to the selected coil is half or smaller than the sum of the outer diameter of the
20 selected coil and the diameter of the adjacent coil, wherein at least one turn portion of the selected coil is arranged in a manner meshing with the adjacent coil.

14. An array type choke coil according to claim 13, wherein
25 the selected coil and the adjacent coil have the number of turns of N turn (where N is an integer equal to or greater than 2), to provide an arrangement such that $(N - 1)$ turn portion of the selected coil is in mesh with the selected coil.

30 15. An array type choke coil according to claim 13, wherein

the coil group is arranged such that the difference between the outer diameter and the inner diameter of the selected coil and a difference between the outer diameter and the inner diameter of the adjacent coil are equal, and the distance between the center point of the selected coil and the center point of the adjacent coil coincides with half of the sum of the outer diameter of the selected coil and the inner diameter of the adjacent coil.

16. An array type choke coil according to claim 13, wherein a predetermined inductance value is obtained by changing the distance between the center point of at least one coil selected from the coil group and the center point of a coil adjacent to the selected coil.

17. An array type choke coil according to claim 13, wherein the coil group is arranged such that the direction of magnetic flux in a coil of upon flow of a current to at least one coil selected from the coil group and the direction of magnetic flux upon flow of a current to a coil adjacent the selected coil are same in direction.

18. An array type choke coil according to claim 13, wherein the coil group is arranged such that the direction of magnetic flux in a coil of upon flowing a current to at least one coil selected from the coil group and the direction of magnetic flux upon flow of a current to a coil adjacent the selected coil are different.

19. An array type choke coil according to claim 9 or 13, wherein the coil group structure arranges the plurality of coils all in line.

20. An array type choke coil according to claim 1, 2, 9 or 13, wherein at least one coil selected from the plurality of coils is arranged in a position deviated from the other coils arranged
5 in line.

21. An array type choke coil according to claim 1, 2, 9 or 13, wherein the coil group is arranged such that selected two or more input terminals or selected two or more output terminals or
10 both are arranged exposed at a same surface.

22. An array type choke coil according to claim 1, wherein the coil group has the plurality of coils constituting the coil group buried within the magnetic material.
15

23. An array type choke coil according to claim 22, wherein a predetermined inductance value is obtained by changing the intervals between the plurality of coils.

20 24. An array type choke coil according to claim 22, wherein the coil group is arranged such that magnetic fluxes in the coils caused upon flow of currents to the plurality of coils are in the same direction.

25 25. An array type choke coil according to claim 22, wherein the coil group is arranged such that magnetic fluxes in the coils caused upon flow of currents to the plurality of coils alternately in direction.

30 26. An array type choke coil according to claim 22, wherein

the plurality of coils have the number of turns of $(N + 0.5)$ turns (where N is an integer equal to or greater than 1), to provide an arrangement structure where coils in upper and lower positions have respective 0.5 turn portions lying on a same plane.

5

27. An array type choke coil according to claim 22, wherein all of the input terminals or all of the output terminals of the plurality of coils or both are exposed at the same surface.

10

28. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the magnetic material is formed from at least one of the group consisting of a ferrite magnetic material, a composite of a ferrite magnetic powder and an insulating resin and a composite of a metal magnetic powder and an insulating resin.

15

29. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein an insulation film is formed on the surface of the coil.

20

30. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the coil group has at least two terminals exposed at respective different surfaces.

25

31. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the coil group has at least one terminal exposed at at least two surfaces the bottom surface and the surrounding surface thereof.

30

32. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the coil group terminal portions which are exposed

at the surface have a substrate layer containing nickel (Ni) or a nickel (Ni), and an uppermost layer which is formed of a solder layer or thin (Sn) layer.

5 33. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the magnetic material is provided with an indication area indicative of the input terminals or output terminals or both.

10 34. An array type choke coil according to claim 1, 2, 9, 13 or 22, wherein the magnetic material is formed in a rectangular prism form.

15 35. An electronic apparatus characterized by mounting an array type choke coil according to claim 1, 2, 9, 13 or 22.